

What is claimed:

1           1. A metallization insulating structure, comprising:  
2           a substrate;  
3           a substantially fluorine free insulating layer formed on the  
4           substrate, having a height,  $h_i$ ;  
5           a fluorine containing insulating layer formed on the  
6           substantially fluorine free insulating layer, having a  
7           height  $h_f$ .

1           2. The insulating structure according to claim 1 further  
2           comprising a capping layer formed on the fluorine containing  
3           insulating layer.

1           3. The insulating structure according to claim 2 wherein  
2           the fluorine containing insulating layer comprises a material  
3           selected from the group consisting of fluorinated silicon oxide,  
4           fluorinated amorphous carbon, fluorinated diamondlike carbon and  
5           fluorinated organic polymers.

1           4. The insulating structure according to claim 2 wherein  
2           the substantially free insulating layer comprises undoped silicon  
3           glass.

1           5. The insulating structure according to claim 1 further  
2 comprising a capping layer formed prior on the substrate prior to  
3 the substantially fluorine free insulating layer.

1           6. The insulating structure according to claim 5 wherein  
2 the capping layer comprises a material selected from the group  
3 consisting of silicon nitride, silicon carbide and hydrogenated  
4 silicon carbide, or combinations thereof.

1           7. The insulating structure according to claim 5 wherein  
2 the substantially free insulating layer comprises undoped silicon  
3 glass.

1           8. The insulating structure according to claim 5 wherein  
2 the fluorine containing insulating layer comprises a material  
3 selected from the group consisting of fluorinated silicon oxide,  
4 fluorinated amorphous carbon, fluorinated diamondlike carbon and  
5 fluorinated organic polymers.

1           9. A metallization structure, comprising:  
2 a substrate;  
3 a substantially fluorine free insulating layer formed on the  
4 substrate, having a height,  $h_i$ ;  
5 a fluorine containing insulating layer formed on the

6                   substantially fluorine free insulating layer, having a  
7                   height  $h_f$ ;  
8                   a patterned metal structure, the metal structure having  
9                   sidewalls and a bottom, the bottom of the metal structure in  
10                  contact with the substrate and the sidewalls of the metal  
11                  structure in contact with the substantially fluorine free  
12                  insulating layer and the fluorine containing insulating layer.

1                  10. The metallization structure according to claim 9  
2                  wherein the patterned metal structure comprises at least two  
3                  portions, each portion having a height.

1                  11. The metallization according to claim 10 wherein the  
2                  height of one of the at least two portions is greater than the  
3                  height of the substantially fluorine free layer.

1                  12. The metallization according to claim 10 wherein the  
2                  height of one of the at least two portions is less than the  
3                  height of the fluorine containing layer.

1                  13. The metallization according to claim 11 wherein the  
2                  height of one of the at least two portions is less than the  
3                  height of the fluorine containing layer.

1           14. The metallization according to claim 13 wherein the  
2 portion with the height less than the height of the fluorine  
3 containing layer is a line.

1           15. The metallization according to claim 14 wherein the  
2 portion with the height greater than the height of the  
3 substantially fluorine free layer is a via.

1           16. A method of forming a metallization insulating  
2 structure, comprising the following steps:

3           depositing a substantially fluorine free insulating layer on  
4 a preexisting substrate, having a height,  $h_i$ ; and

5           forming a fluorine containing insulating layer on the  
6 substantially fluorine free insulating layer, having a height  $h_f$ .

1           17. The method according to claim 16 further comprising the  
2 steps of patterning the layer and depositing a metal.

1           18. The method according to claim 17 wherein the patterning  
2 comprises at least two portions, each portion having a height.

1           19. The method according to claim 18 wherein the height of  
2   one of the at least two portions is greater than height of the  
3   substantially fluorine free insulating layer and the height of  
4   the other of the at least two portions is less than the height of  
5   the fluorine containing insulating layer.